Course Syllabus – Valuation for Financial Engineering FRE-6103

David C. Shimko, Industry Full Professor of Financial Engineering, Fall 2025

Instructor email:	david.shimko@nyu.edu
Office:	1 Metrotech, 10th Floor
Office hours:	Thursday 2:00-4:00 p.m. (Please direct homework questions to Tas) By Zoom appointment, or in-person appt,
Sections by location/Time:	RH 216 2:00-4:30 Weds RH 216 6:00-8:30 Weds RH 216 11:00-1:30 p.m. Thurs RH 216 11:00-1:30 p.m. Fri
Teaching Assistants	Tarun Kumar (ti2142@nyu.edu) Omkar Patole (op2175@nyu.edu) Wenda Zhai (wz2914@nyu.edu) Yutong Zhang (yz10985@nyu.edu)

FRE 6103 introduces financial engineers to robust risk-based valuation methods in discrete time. This includes four major applications: cash flows, traded derivative contracts, nontraded and embedded derivatives, and corporate assets & liabilities.

- "Cash flows" refers to risk-free and risky payments or expenditures.
- "Traded derivatives" include a high-level integrative treatment of forward contracts and the most commonly traded option contracts.
- "Nontraded and embedded derivatives" refer to contingent cash flows created in the normal processes of contracting and asset management
- "Corporate assets" refer to claims to cash flows owned and managed by corporations
- "Corporate liabilities" refers to corporate-issued securities or other payment obligations incurred by corporations

This is not a generalist MBA finance course. Being designed for engineers, it focuses on deep analytical methods, is computational in nature, and is driven by practical problems encountered by finance professionals. Being an introductory core course, it does not go into depth into all subject areas, but provides a suitable and broad foundation for advanced elective courses in advanced valuation, corporate finance, investment, derivatives, and trading.

Instructor information:

Prof David C. Shimko

Resume in brief:

- Assistant Professor, Marshall School, USC
- Adjunct Professor, Harvard Business School
- Adjunct Professor, NYU Courant
- Head of Commodity Derivatives Research, JPMorgan
- Head of Credit Research, JPMorgan
- Head of Risk Management Advisory, Bankers Trust
- CEO and co-founder of Risk Capital, an independent risk advisory firm
- CEO and co-founder of CreditCircle, a marketplace lending platform
- Director of public, private and non-profit entities including GARP
- Widely published in derivatives valuation, risk management, commodities and credit
- Currently Industry Full Professor of Financial Engineering, FRE Department, NYU Tandon
- Scholar, www.wallstreetscholars.com
- Father of five, grandfather of five

Class organization:

Required texts: Valuation for Financial Engineers, class notes to be provided by Prof Shimko. This has been provided on Brightspace. Corporate Finance, 4th Edition (MFE Version) by Ivo Welch is recommended for the corporate finance chapters. The Welch text is available free online or a print copy may be purchased. Other readings may be used as supplements and will be provided to students as needed.

Brightspace: Please follow the course requirements and announcements online weekly, as they are likely to change as the term progresses.

Recommended calculators: You may use any calculator. You may also use a smart phone app or simply use Excel in class.

Recommended analytic software: I prefer Excel, not for its elegance or ease of use, but for the ease of collaboration and visualization with colleagues, supervisors and clients. **You must have access to Excel to complete your assignments.** You have the option to use Python for completing more complex projects.

Course grading: This will be a combination of homework and nine 2-person mini projects (50%), a midterm exam (25%), and a final exam (25%). If you actively ask and answer decent questions in class, your grade will be selectively rounded upward. Each project team will consist of at most two people, and the group *must be different for each project*. Note: Brightspace may assign grades to you based on 90/80/70/60 kindergarten-style scoring. PLEASE IGNORE ANY GRADES GIVEN BY BRIGHTSPACE! All grading in this class is on a curve, and all sections will be combined.

The expected grade distribution is 50% in the A range and 50% in the B range. The actual distribution may vary from expectations depending on the class performance as a group.

Missed class policy: I do not take responsibility for your missed classes. You are not penalized for missing classes, however, your participation grade may suffer. If you must miss a class, be sure to study the powerpoint presentation and any sample spreadsheets from that week.

Office hours: TA hours TBA on Brightspace. Please consult Tas for help with assignments and projects. Prof Shimko is available for other matters in-person Thursday 2-4 p.m. or Zoom appointment. Email: david.shimko@nyu.edu.

NYU Class Prerequisites: None for FRE students
Functional prerequisites: Calculus, Linear algebra, Python recommended
Analytical skills taught: Basic stochastic calculus, simulation, financial economics, financial valuation models & model-building

Class outline, subject to revisions

Wk	Dates	Content	MiniProject Due
1	Sep 3-5	Valuation Puzzles in Finance	
		Using the GVE to value cash flows	
2	Sep 10-12	Amortization, fixed rate bonds and financial decisions in Excel	MP01 – Rent vs. Buy
		Bootstrapping, ZCBs and the Term Structure	
3	Sep 17-19	Floating rate bonds, variable interest rates and interest rate risk	
		Inflation, TIPS, and currencies	
		Corporate bonds and default models	
4	Sep 24-26	Basics of simulation	MP02 – ZCB Term Structure
		Multivariate simulations and copulae	
5	Oct 1-3	Stochastic processes used in finance	MP03 – CDOs
		Advanced topics in stochastic processes	
6	Oct 8-10	MPT, Sharpe's CAPM and Lintner's CAPM	MP04 – S&P Dynamics
7	Oct 15-17	**MIDTERM EXAM**	
8	Nov 5-7	Futures valuation and practice	MP05 – Portfolio optimization with derivatives
9	Nov 12-14	Exchange-traded options	MP06 – Futures Term Structure
10	Nov 19-21	Contracts, real options, options on futures and complex options	MP07 – Modern Option valuation
11	Nov 26-28	**THANKSGIVING HOLIDAY**	
12	Dec 3-5	Corporate financial decisions and capital budgeting	MP08 – Exotic option valuation
		Corporate financing and capital structure	
13	Dec 10-12	Corporate risk management	MP09 – Corporate capital structure & risk management
14		**FINAL EXAM** **Early option: Dec 12** (will not include corporate risk management)	

Policies

Academic Misconduct

A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.
2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work that was meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission have been received from the course instructor(s) or research adviser involved.
6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the **Moses Center for Students with Disabilities** (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Inclusion Statement

The NYU Tandon School values an inclusive and equitable environment for all our students. I hope to foster a sense of community in this class and consider it a place where individuals of all backgrounds, beliefs, ethnicities, national origins, gender identities, sexual orientations, religious and political affiliations, and abilities will be treated with respect. It is my intent that all students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit.